

Bibliometric Analysis of Research on Curriculum Alignment: A Web of Science Example

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Abstract: This study aims to examine the research published in the Web of Science database on Curriculum Alignment using the bibliometric analysis method. A bibliometric analysis of the studies included in the research was conducted on August 10, 2023. The "Web of Science Core Collection" was searched by entering the keyword "Curriculum Alignment." One hundred-five studies were included in the evaluation. VOSviewer package program was used for bibliometric analysis of article data. According to the general data of bibliometric analysis, 105 studies were published in 42 different sources, and the average number of citations per document was 11.21. When the distribution of articles according to publication years is examined, most articles were published in 2021. It was understood that there were more publications on Curriculum Alignment in the journals Chemical Education and Assessment in Education: Principles, Policy & Practice. It has been determined that studies on curriculum alignment are concentrated in the United States; The United States was followed by Australia, England, South Africa, Canada, and the People's Republic of China, respectively. It has been determined that topics such as learning outcomes, curriculum mapping, problem-based learning, analytical competencies, in-service teachers, enacted curriculum, curriculum change, collaboration, and assessment design are current issues discussed together with curriculum alignment. A limited number of studies have been conducted on Curriculum Alignment in Turkey. It may be recommended to conduct new studies on the subject.

Keywords: Curriculum alignment, Alignment, Assessment, Curriculum development, Learning outcomes

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Introduction

As a different approach from systematic literature review, bibliometric analysis is an analytical method for obtaining formal and quantitative data about the current state of a discipline. It makes it easier to track academic trends thanks to visualization software. This approach can be confused with bibliometric terms concepts such as webometrics, cybermetrics, and informetrics. The final goal of the bibliometrics approach is to obtain quantitative data and numerical measurement indicators on research performance. This approach provides researchers with important information about the intellectual and conceptual structure of the field, with the information it provides about periodicals, documents, authors, and concepts related to a specific field (Zupic &

Cater, 2015).

With bibliometrics, quantitative findings are obtained, such as the productivity of countries, authors, universities, and journals, strong and weak research areas, gaps in the literature, collaboration networks, potential opportunities, and the widespread effects of studies produced in a field. Despite all its limitations, bibliometrics, which can also be used as the initial stage of a systematic literature review, can be considered the first step of any research and can be counted among the reasons why it has received widespread attention today.

This research aims to conduct a bibliometric analysis of studies on "Curriculum alignment." The results to be obtained are essential in determining the direction of education research, monitoring developments, and shaping education policies. This type of analysis examines the curriculum, learning objectives, student success, and teaching in education. It can direct research to evaluate and improve the effectiveness of methods.

Curriculum Alignment

Curriculum alignment is an important concept that refers to the harmonious design and implementation of different components, goals, and contents within the education system. This process aims to consistently integrate learning objectives, teaching methods, measurement and evaluation tools, and curriculum. Curriculum alignment necessitates a robust correlation among objectives and assessments, objectives and instructional methods and resources, and assessments and instructional methods and resources. In simpler terms, it encompasses the broader idea of 'curriculum alignment,' which includes content validity, content coverage, and the availability of learning opportunities (Anderson, 2002). Curriculum alignment is the execution of the curriculum by the designed form as stakeholders (practitioners). Just as a vehicle works thanks to the harmony of all its parts, curriculum harmony can be explained by the harmonious operation of the desired products in the educational processes (Bay, 2016).

Curriculum alignment is a strategy to increase integrity and effectiveness in the educational system. This strategy aims to improve the suitability of training programs to specific goals and the process of achieving these goals. Fullan and Pomfret (1977) highlighted four critical factors to ensure the successful implementation of this strategy. First of all, practitioners must understand the innovations and changes targeted in the programs. Teachers' competence and willingness to implement these changes play a critical role in determining the impact of curriculum alignment.

In addition, schools must provide the necessary infrastructure support for implementation, and their organizational structures must be suitable to realize these innovations. These four factors support the successful implementation of curriculum alignment and increase the impact of changes in the education system. Curriculum alignment is important to promote educational improvements and increase student, teacher, and school success.

One of the critical concepts associated with curriculum alignment is the concept of curriculum fidelity. This concept refers to teachers implementing a new program or innovation as planned by program development experts (Pence et al., 2008). Examining adherence to the curriculum reveals the relationship between the program and its outcomes. It reduces the possibility of reaching incorrect conclusions about the program's effectiveness by providing information about the process (Bümen et al., 2014).

Curriculum alignment is considered an essential strategy in educational systems and positively affects student, school, and teacher success. These effects promote higher quality and success in education. Curriculum alignment helps optimize students' learning processes. Aligning educational materials and learning objectives allows students to understand lessons and learn information more effectively. Research shows that curriculum alignment increases student success and supports students in achieving higher exam scores (Porter, 2002). Through curriculum alignment, schools can design educational programs more consistently and effectively. This allows schools to monitor and improve student achievement (Anderson, 2002). Research shows that curriculum alignment increases school achievement and helps schools achieve better educational outcomes (Odden & Archibald, 2009).

Teachers have the opportunity to provide better instruction to students through curriculum alignment. A cohesive curriculum gives teachers more explicit goals and helps them select instructional materials more effectively (Crowell & Tissot, 1986). Research shows that curriculum alignment increases teacher effectiveness and contributes to teachers achieving better results (Marsh et al., 2018). These positive effects of curriculum alignment contribute to better performance of education systems and better preparation of students. For this reason, many countries and regions that shape education policies and practices adopt curriculum harmonization as an essential strategy (UNESCO, 2005). This approach is a necessary research and practice topic in the education field as it can potentially increase student, school, and teacher success.

Method

This research, which was conducted to examine the studies on curriculum alignment published in the Web of Science (WoS) database using the bibliometric analysis method, is of descriptive type. The research population consisted of 143 articles accessed by searching the WoS database with keywords. The research sample consisted of 142 research articles that met the inclusion criteria. To gather research data, an online search was performed on August 10, 2023. A data document was created for analysis. Data were collected by scanning the WoS database with the "curriculum alignment" keyword. In the first stage, 143 articles were reached. The articles retrieved were limited to "educational research" and "education scientific disciplines." Documents of 105 studies that met these limitations were created and downloaded in "Export Records to Tab Delimited File" format. Bibliometric analysis of the data was performed using the downloaded document VOSviewer program. The accessed data file was examined through author, citation, journal, and keyword analyses. Contents indexed in Web of Science were taken as criteria.

Results

Descriptive Analysis

According to the bibliometric data of 105 studies that met the inclusion criteria, it was observed that studies on "curriculum alignment" started in 1993 and were published in 42 different sources. A large proportion of the studies are in the article type. The average number of citations per document is 11.21. The total number of authors mentioned in the studies is 286. A large proportion of the studies are in English (Table 1).

Table 1. General Information About the Data

General information	
Time range	1993-2023
<i>Type</i>	
Article	80
Proceeding Paper	20
Book Chapters	3
Others	2
Average number of citations per document	11,21
Total number of authors	286
<i>Publication language</i>	
English	102
Spanish	3

It has been observed that studies on the subject have yet to be carried out at all in some years. It was determined that the most work was done in 2021, 2015, 2018 and 2019. The increase in the number of studies has led to an increase in citations. However, it is noticeable that the number of studies on the subject has decreased in recent years (Figure 1).

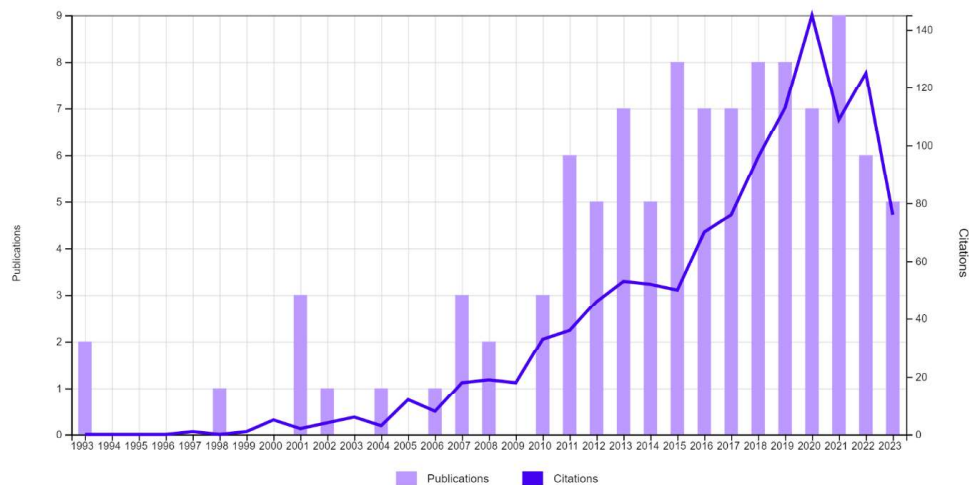


Figure 1. Distribution of Studies by Publication Years

It has been determined that studies on curriculum alignment are concentrated in the United States. The United States was followed by Australia, England, South Africa, Canada, and the People's Republic of China, respectively. In Turkey, it has been observed that studies on the subject have been carried out at a minimum (Figure 2).

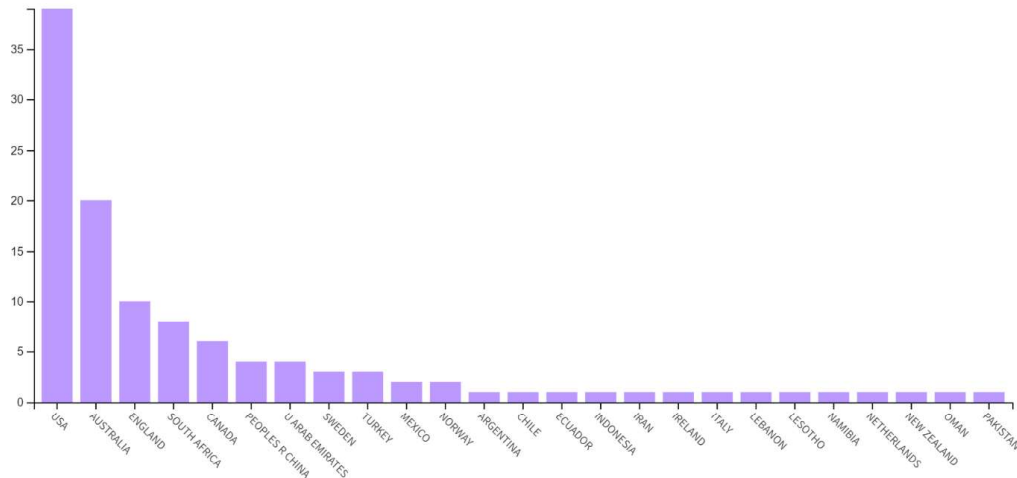


Figure 2. Distribution of Studies by Country

Review of Published Resources

The number of journals with at least one cited publication on the subject is 37 (see Figure 3).

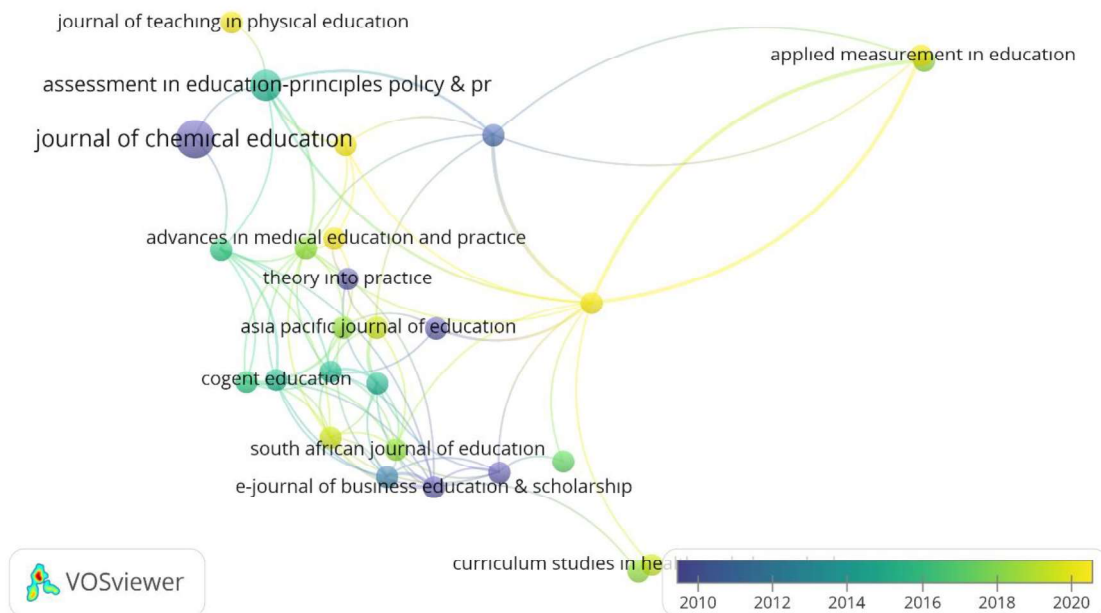


Figure 3. Distribution of Studies by Journals

The journals with the most publications are the Journal of Chemical Education (n=3) and Assessment in Education: Principles, Policy & Practice (n=3). However, the journals where the most cited studies were published are Educational Technology Research and Development, Asia-Pacific Journal of Cooperative Education, Educational Assessment, Evaluation and Accountability, International Journal for Academic Development, Journal of Physical Education, Recreation & Dance, Research in Learning Technology is the Journal of Curriculum Studies. It is a striking result that the number of studies on "Curriculum alignment" in the Journal of Curriculum Studies is low. "Curriculum alignment" is a current issue in journals such as the Australian Journal of Teachers and Applied Measurement in Education

Co-authorship of Authors

Some of the most cited authors are Theodore J. Kopcha, Howard Sullivan, Debra Coulson, and Marina Harvey. It is impossible to say there is an earnest collaboration between the authors. In the cluster where the most collaboration is observed, researchers such as William Schulz, Henry Brashan, Steven Danvar, Linda Gatlin, Linda Liltz, and Sheryl Kristensen (Figure 4).

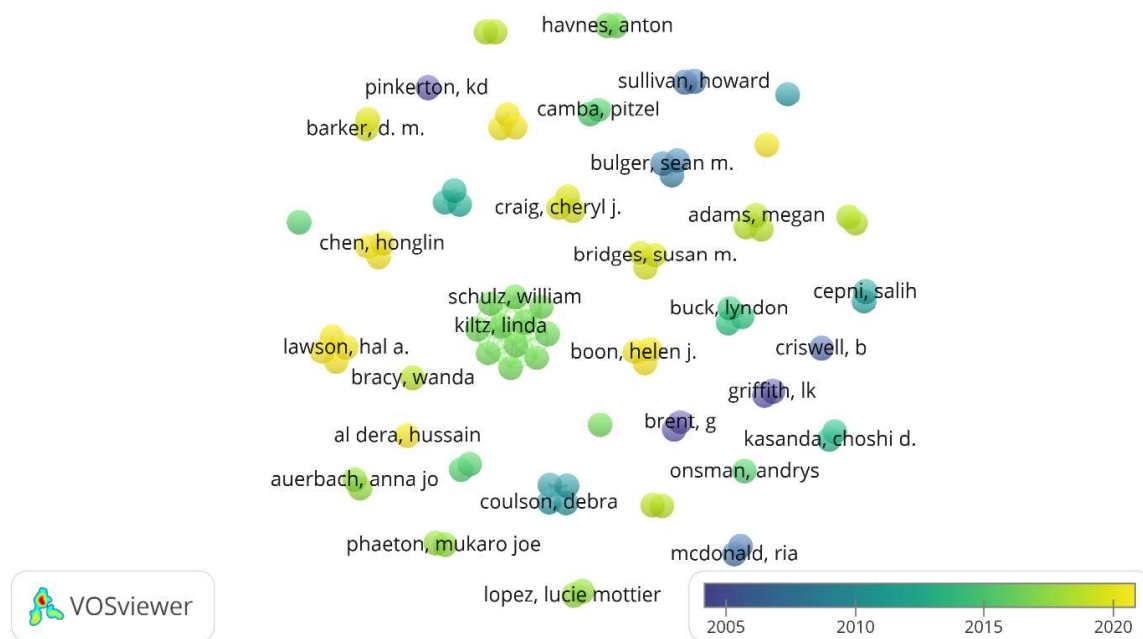


Figure 4. Co-authorship of Authors

Citation of Authors

Among the authors with the highest total connection strength are researchers such as Salih Cepni (n=5), Yilmaz Kara (n=5), Ria, Mcdonald (n=5), and Helen Van der Horst (n=5). Notably, researchers such as Sigrid Merx and Leoniek Wijngaards-de Meij have higher citation numbers and total connection strengths (Figure 5).

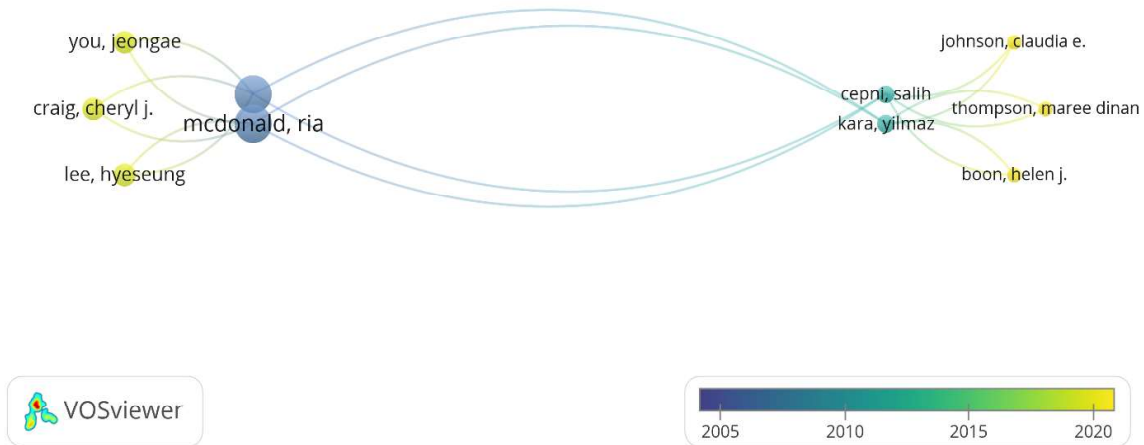


Figure 5. Citation of Authors

Keyword Analysis

The most used keywords include Curriculum alignment (n=27), assessment (n=5), alignment (n=4), curriculum (n=4), curriculum development (n=3), and learning outcomes (n=2). There are the words Professional development (n=2) and pedagogy (n=2). The keywords with the highest total link strength are listed as Curriculum alignment (n=96), assessment (n=18), curriculum (n=16), alignment (n=11), and curriculum development (n=10) (Figure 6). It has been determined that topics such as learning outcomes, curriculum mapping, problem-based learning, analytical competencies, in-service teachers, enacted curriculum, curriculum change, collaboration, and assessment design are current issues discussed together with "Curriculum alignment."

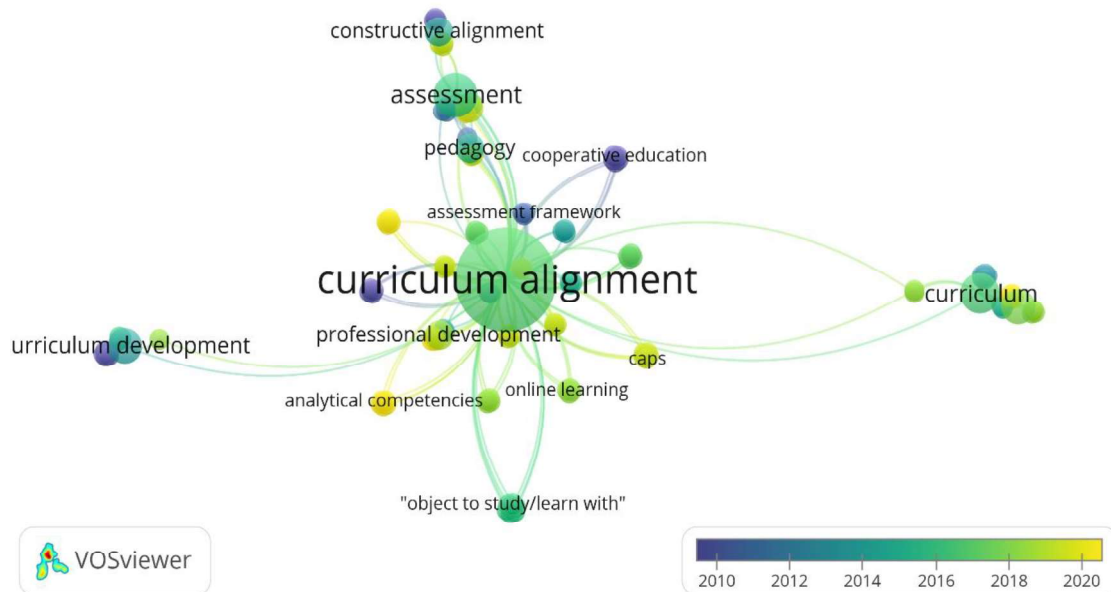


Figure 6. Keyword Analysis

Discussion

This study presents a bibliometric analysis of research on Curriculum Alignment in the Web of Science database. The results obtained show the importance and development of research in this field. The results show that interest in Curriculum Alignment has increased, and research in this field has spread rapidly. An average number of citations of 11.21 can be considered as an indicator that these studies are accepted in the academic community.

Additionally, it was observed that most of the studies in this field were published in 2021. This shows that Curriculum Alignment has recently gained importance, and more research is being done in this area. Journals such as Chemical Education and Assessment in Education: Principles, Policy & Practice have become an essential platform for studies on this subject. It is a striking result that the number of studies on "Curriculum alignment" in the Journal of Curriculum Studies is low.

Notably, the United States is a leader in research in this field. Other countries, particularly Australia, the United Kingdom, South Africa, Canada, and the People's Republic of China, are making significant contributions. This shows that the issue of Curriculum Alignment is of international importance.

The research conducted on the subject shows that important issues such as learning outcomes, curriculum mapping, problem-based learning, analytical competencies, in-service teachers, enacted curriculum, curriculum change, collaboration, and assessment design are discussed. These topics have come to the fore as current concepts at the center of Curriculum Alignment. However, it has been determined that studies in this field in Turkey are limited. Therefore, researchers and educational institutions in Turkey should be encouraged to conduct more studies on Curriculum Alignment.

Anderson (2002) underscores the significance of curriculum alignment by delineating four fundamental reasons. First and foremost, curriculum alignment assumes a pivotal role as it necessitates a robust interconnection among teachers' objectives, assessments, instructional activities, and materials. These interrelationships form an integral part of the broader framework known as "curriculum alignment," encompassing pivotal curriculum components such as relevance, content comprehensiveness, and the provision of ample learning opportunities. This holistic alignment ensures that educational components harmoniously coexist, contributing to a coherent and effective curriculum. Secondly, proper curriculum alignment serves as a catalyst for comprehending the disparities in the impact of schooling on student achievement. In essence, a cohesive curriculum facilitates a more discerning analysis of the various factors influencing student achievement. This comprehensive understanding enables educators and policymakers to tailor instructional strategies and resources more effectively to enhance educational outcomes. Thirdly, the repercussions of inadequately aligned curricula are not to be underestimated, as they may lead to a miscalculation of the instructional impact on student learning. Regardless of the proficiency and dedication of educators, the effectiveness of teaching can be further amplified

when the curriculum is aligned with state standards and assessments. This underscores the critical importance of curriculum alignment in optimizing the learning experience. Lastly, the imperative for curriculum alignment is underscored by the contemporary emphasis on educational accountability. Over the years, the responsibility for ensuring accountability in education has transitioned from students and their home backgrounds to educational institutions. Irrespective of the focal point, curriculum alignment remains pivotal to the success of accountability initiatives. It provides a solid foundation for evaluating educational progress, facilitating data-driven decision-making, and ultimately enhancing the overall quality of education.

In essence, Anderson's (2002) insights highlight that curriculum alignment is not merely an administrative necessity but an essential driver of educational efficacy, ensuring that teaching and learning processes align seamlessly with intended goals and outcomes. However, there are limited studies about curriculum alignment in the Web of Science database in Turkey (Kara & Cepni, 2011; Tekir, 2021; Yılmaz & Sunkur, 2021). This limited number of studies limits our understanding of how curriculum alignment affects students, schools, teachers, and the education system. Further research may help us better understand the effects of curriculum alignment on the Turkish education system.

Conclusion

This study presented a bibliometric analysis of research on Curriculum Alignment and revealed various results. The results of the research can be summarized under the following main headings:

- The number of research conducted in the field of Curriculum Alignment and the number of citations are increasing. This shows that the subject has become essential in the academic community.
- The increase in the number of studies conducted in 2021 shows that Curriculum Alignment has received increasing attention in recent years.
- Journals such as Chemical Education and Assessment in Education: Principles, Policy & Practice are important sources where research in Curriculum Alignment is published. Additionally, it is a striking result that the number of studies on "Curriculum alignment" in the Journal of Curriculum Studies is low.
- The United States is a country where research in this field is concentrated and follows other countries.
- Issues such as learning outcomes, curriculum mapping, and problem-based learning are central to Curriculum Alignment.
- Research in Turkey is limited, and more work needs to be done in this field.

Recommendations

Based on the results of this study, some suggestions can be made for future research on Curriculum Alignment:

- International cooperation should be encouraged, and information sharing between researchers in

different countries should be increased. This can enrich knowledge in the field.

- Support should be given to researchers and educational institutions to increase research on Curriculum Alignment in Turkey.
- New and innovative Curriculum Alignment methods should be developed, and the effectiveness of these methods should be investigated.
- Research on Curriculum Alignment should be conducted to encourage the participation of researchers from different disciplines.
- How research in this field can contribute to education policies should be examined in more detail.

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